

AP/ITW



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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In re Patent Application of:

Appellant : Akira NAKASHIMA et al.  
Title : COATING LIQUID FOR FORMING AMORPHOUS SILICA-  
BASED COATING FILM WITH LOW DIELECTRIC CONSTANT  
Serial No. : 10/533,302  
Filed : June 16, 2005  
Group Art Unit : 1755  
Examiner : MCDONOUGH, JAMES E

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**APPEAL BRIEF UNDER 37 CFR § 41.37**

November 24, 2008

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

In response to the Notification of Non-Compliant Appeal Brief  
mailed on October 30, 2008, Revised Appeal Brief has been filed  
herewith.

### **REAL PARTY IN INTEREST**

The real party in interest is Catalysts & Chemicals Industries Co., LTD and Fujitsu Limited.

### **RELATED APPEALS AND INTERFERENCES**

Appellants, Appellants' representative, and the Assignee of this application are aware of no other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on, the Board's decision in the pending appeal.

### **STATUS OF CLAIMS**

This is an appeal from the twice rejected claims 1-7, 10, and 29-38 as last entered in the RCE of January 15, 2008.

Claims 8, 9 and 11-28 were canceled.

Claims 1-7, 10, and 29-38 are pending in the application and stand rejected.

The rejection of claims 1-7, 10, and 29-38 are appealed and the claims are set forth in their entirety in the Claims Appendix attached hereto.

### **STATUS OF AMENDMENTS**

The amendments to the claims, presented in Appellants' amendment filed January 15, 2008, in response to the Advisory Action of November 20, 2007 have been entered.

### **SUMMARY OF CLAIMED SUBJECT MATTER**

Independent claim 1 recites a coating liquid for forming an amorphous silica-based coating film with a low dielectric constant on a substrate, comprising:

a silicon compound obtained by hydrolyzing  
tetraalkyl ortho silicate (TAOS) and alkoxysilane (AS)

represented by the following general formula (I) in the presence of purified tetraalkyl ammonium hydroxide (TAAOH) (See Specification, paragraph [0028]) without containing impurities comprising compounds of alkali metal elements and halogen group elements (See Specification, paragraph [0035]), a molar ratio of TAOS:AS being in a range of 6/4 to 2/8 (See Specification, paragraph [0036]) and a molar ratio of TAAOH:(TAOS+AS) being in a range of 1/10 to 7/10, (See Specification, paragraph [0037]) and

said purified tetraalkyl ammonium hydroxide (TAAOH),



wherein X indicates a hydrogen atom, a fluorine atom, or an alkyl group, a fluorine-substituted alkyl group, an aryl group or a vinyl group each having 1 to 8 carbon atoms; R indicates a hydrogen atom, or an alkyl group, an aryl group or a vinyl group each having 1 to 8 carbon atoms; and n is an integral number from 1 to 3 (See Specification, paragraph [0028]).

Independent claim 2, supported by the specification as annotated below, recites a coating liquid for forming an amorphous silica-based coating film with a low dielectric constant on a substrate, comprising:

a silicon compound obtained by hydrolyzing or partially hydrolyzing tetraalkyl ortho silicate (TAOS) in the presence of purified tetraalkyl ammonium hydroxide (TAAOH) (See Specification, paragraph [0048]) without containing impurities comprising compounds of alkali metal elements and halogen group elements, mixing

a reaction product with alkoxysilane (AS) represented by the following general formula (I) or a hydrolysate or a partial hydrolysate thereof (See *Specification*, paragraph [0048]), and further hydrolyzing all or a portion of a mixture:



wherein X indicates a hydrogen atom, a fluorine atom, or an alkyl group, a fluorine-substituted alkyl group, an aryl group or a vinyl group each having 1 to 8 carbon atoms (See *Specification*, paragraph [0048]); R indicates a hydrogen atom, or an alkyl group, an aryl group or a vinyl group each having 1 to 8 carbon atoms; and n is an integral number from 1 to 3 (See *Specification*, paragraph [0016(iii)] and [0063]).

#### **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

##### 35 U.S.C. § 103(a)

(1) Whether claims 1-7, 29-35, 37 and 38 are unpatentable under 35 U.S.C. 103(a) over Komatsu et al. (US 6,451,436) in view of Raman et al. (US 5,770,275), Senderov et al. (US 2003/01525510), and Taguchi et al. (JP 406,173,054).

(2) Whether claims 10 and 36 are unpatentable under 35 U.S.C. 103(a) over Komatsu in view of Raman, Senderov, and Taguchi as applied to claims 1-9 and 29-35 above, and further in view of Burger et al. (US 2004/0041779).

#### **ARGUMENT**

(1) Whether claims 1-7, 29-35, 37 and 38 are unpatentable under 35 U.S.C. 103(a) over Komatsu et al. (US 6,451,436) in view of Raman

et al. (US 5,770,275), Senderov et al. (US 2003/01525510), and Taguchi et al. (JP 406,173,054).

On page 2 of the final Action, claims 10 and 36 were included in the above rejection. However, no rejection is actually made on pages 2-4. Therefore, the arguments for claims 10 and 36 are not made on this section.

**Claim 1 is patentable under 35 U.S.C. §103(a)**

Claim 1 recites, *inter alia*, a silicon compound obtained by hydrolyzing tetraalkyl ortho silicate (TAOS) and alkoxysilane (AS) in the presence of "purified tetraalkyl ammonium hydroxide (TAAOH) without containing impurities comprising compounds of alkali metal elements and halogen group elements, a molar ratio of TAOS:AS being in a range of 6/4 to 2/8 and a molar ratio of TAAOH:(TAOS+AS) being in a range of 1/10 to 7/10" (emphasis added).

In the last paragraph of page 3 of the Office Action, the Examiner acknowledges that "Senderov does not explicitly teach the purification of tetraalkyl ammonium hydroxide," and relies upon Taguchi to remedy the deficiencies of Komatsu and Senderov. Appellants respectfully disagree.

First, the asserted combination of references does not teach or suggest all of Appellants' claim features.

Second, the grounds of rejection constitute an improper reconstruction of Appellants' claimed invention.

In the present invention, it is very important to 1) use purified tetraalkyl ammonium hydroxide which does not substantively include impurities comprising alkali metal elements and halogen group elements; and 2) to leave tetraalkyl ammonium

hydroxide added at the time of preparation of the coating film inside the coating film as it is.

If tetraalkyl ammonium hydroxide containing alkali metal elements and halogen group elements as impurities is used in forming the coating film, a zeolitic coating, which has projections and dents on the surface thereof is formed. Therefore, no smooth surface is obtained on the coating film. However, in the present invention, since purified tetraalkyl ammonium hydroxide is used, the zeolitic coating is not formed on the coating surface.

Appellants' coating is distinguished from the recited art in that Komatsu appears to disclose wherein the silica-based coating film with the low dielectric constant has a polymer composition consisting of the hydrolysate of the alkoxysilane and/or the halogenated silane. Komatsu neither describes nor suggests that "the silicon compound (hydrolysate) and tetraalkyl ammonium hydroxide (TAAOH)" of the present invention are included. Other references do not disclose or suggest the specific combination of the compounds of the invention. Furthermore, Appellants recite wherein tetraalkyl ammonium hydroxide must not include impurities to avoid zeolitic coating. However, such removal of impurities is not disclosed in any cited references.

Appellants respectfully submit that Taguchi appears to only relate to a method of purifying tetraalkyl ammonium hydroxide solution. Indeed, the Examiner acknowledges (see Office Action, top of page 4) that Taguchi is silent to the exact purity of the tetraalkyl ammonium hydroxide, and alleges that the purity of Taguchi's tetraalkyl ammonium hydroxide "would at least overlap the claimed range." The fact that Appellants do not appear to disclose the purification process does not render the recited purity, i.e., a molar ratio of TAOS:AS being in a range of 6/4 to

2/8 and a molar ratio of TAAOH:(TAOS+AS) being in a range of 1/10 to 7/10, *prima facie* obvious in light of references that fail to disclose a resultant range.

The USPTO's Board of Patent Appeals and Interferences has stated that:

"[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." (*In re Kahn*, 441 F. 3d 977, 988 (CA Fed. 2006) cited with approval in *KSR*, 550 U.S. at 14, 82 USPQ2d).

Appellants respectfully submit that claim 1 is patentable not only due to the failure of the applied references to disclose, teach, or motivate all recited features, i.e., the specific ratio of (TAOS)/(AS), but is also patentable based upon the failure of asserted combination of references to present any apparent reason to combine references or modify prior art to create the Appellants' allegedly obvious claim elements.

Accordingly, the rejection of claim 1 under 35 U.S.C. §103(a) is improper and Appellants respectfully submit, therefore, that independent claim 1 is patentable over the applied art and the rejection should be reversed.

**Claim 2 is patentable under 35 U.S.C. §103(a)**

Claim 2 recites, *inter alia*, a silicon compound obtained by hydrolyzing or partially hydrolyzing tetraalkyl ortho silicate (TAOS) and alkoxysilane (AS) in the presence of "purified tetraalkyl ammonium hydroxide (TAAOH) without containing impurities comprising compounds of alkali metal elements and halogen group elements," (emphasis added). In the last paragraph of page 3 of the Office Action, the Examiner acknowledges that

"Senderov does not explicitly teach the purification of tetraalkyl ammonium hydroxide," and relies upon Taguchi to remedy the deficiencies of Komatsu and Senderov. Appellants respectfully disagree.

Similar to Appellants' argument regarding claim 1, the asserted combination of references does not teach or suggest all of Appellants' claim features.

Second, the grounds of rejection constitute an improper reconstruction of Appellants' claimed invention.

In the present invention, it is very important to 1) use purified tetraalkyl ammonium hydroxide which does not substantively include impurities comprising alkali metal elements and halogen group elements; and 2) to leave tetraalkyl ammonium hydroxide added at the time of preparation of the coating film inside the coating film as it is.

If tetraalkyl ammonium hydroxide containing alkali metal elements and halogen group elements as impurities is used in forming the coating film, a zeolitic coating which has projections and dents on the surface thereof is formed. Therefore, no smooth surface is obtained on the coating film. However, in the present invention, since purified tetraalkyl ammonium hydroxide is used, the zeolitic coating is not formed on the coating surface.

In contrast, Komatsu discloses a silica-based coating film having a low dielectric constant and a polymer composition consisting of the hydrolysate of the alkoxysilane and/or the halogenated silane. Komatsu neither describes nor suggests the "silicon compound (hydrolysate) and tetraalkyl ammonium hydroxide (TAAOH)," as recited in claim 2.

Furthermore, nowhere does the applied art appear to disclose wherein tetraalkyl ammonium hydroxide must not include impurities to avoid zeolitic coating.



Regarding Taguchi, the method disclosed appears to only relate to purifying tetraalkyl ammonium hydroxide solution. Indeed, the Examiner acknowledges (see Office Action, top of page 4) that Taguchi is silent to the exact purity of the tetraalkyl ammonium hydroxide, and alleges that the purity of Taguchi's tetraalkyl ammonium hydroxide "would at least overlap the claimed range." The fact that Appellants may be silent regarding the purification process does not render the recited range *prima facie* obvious, in light of references that fail to disclose a composition having a specific purity.

The USPTO's Board of Patent Appeals and Interferences has stated that:

"[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." (*In re Kahn*, 441 F. 3d 977, 988 (CA Fed. 2006) cited with approval in *KSR*, 550 U.S. at 14, 82 USPQ2d).

Appellants respectfully submit that claim 2 is patentable not only due to the failure of the applied references to disclose, teach, or motivate all recited features, i.e., the specific ratio of (TAOS)/(AS), but is also patentable based upon the failure of asserted combination of references to present any apparent reason to combine references or modify prior art to create the Appellants' allegedly obvious claim elements.

Accordingly, the rejection of claim 2 under 35 U.S.C. §103(a) is improper and Appellants respectfully submit, therefore, that independent claim 2 is patentable over the applied art and the rejection should be reversed.

**Claim 3 is patentable under 35 U.S.C. §103(a)**

Claim 3 depends from claim 1 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein said tetraalkyl ortho silicate (TAOS) is tetraethyl ortho silicate (TEOS), tetramethyl ortho silicate (TMOS) or a mixture thereof." Accordingly, reversal of the rejection is respectfully requested.

**Claim 4 is patentable under 35 U.S.C. §103(a)**

Claim 4 depends from claim 1 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein said alkoxysilane (AS) is methyltrimethoxy silane (MTMS), methyltriethoxy silane (MTES) or a mixture thereof." Accordingly, reversal of the rejection is respectfully requested.

**Claim 5 is patentable under 35 U.S.C. §103(a)**

Claim 5 depends from claim 1 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein said tetraalkyl ammonium hydroxide (TAAOH) is tetrapropyl ammonium hydroxide (TPAOH), tetrabutyl ammonium hydroxide (TBAOH) or a mixture thereof." Accordingly, reversal of the rejection is respectfully requested.

**Claim 6 is patentable under 35 U.S.C. §103(a)**

Claim 6 depends from claim 1 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the

additional features it recites, "wherein a content of impurities comprising compounds of alkali metal elements including sodium (Na) and potassium (K) in said tetraalkyl ammonium hydroxide (TAAOH) is 50 ppb by weight or below on respective element bases." Accordingly, reversal of the rejection is respectfully requested.

**Claim 7 is patentable under 35 U.S.C. §103(a)**

Claim 7 depends from claim 1 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein a content of impurities comprising compounds of halogen group elements including bromine (Br) and chlorine (Cl) in said tetraalkyl ammonium hydroxide (TAAOH) is 1 ppm by weight or less on respective element bases." Accordingly, reversal of the rejection is respectfully requested.

**Claim 29 is patentable under 35 U.S.C. §103(a)**

Claim 29 depends from claim 2 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein said tetraalkyl ortho silicate (TAOS) is tetraethyl ortho silicate (TEOS), tetramethyl ortho silicate (TMOS) or a mixture thereof." Accordingly, reversal of the rejection is respectfully requested.

**Claim 30 is patentable under 35 U.S.C. §103(a)**

Claim 30 depends from claim 2 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein said alkoxysilane (AS) is

methyltrimethoxy silane (MTMS), methyltriethoxy silane (MTES) or a mixture thereof." Accordingly, reversal of the rejection is respectfully requested.

**Claim 31 is patentable under 35 U.S.C. §103(a)**

Claim 31 depends from claim 2 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein said tetraalkyl ammonium hydroxide (TAAOH) is tetrapropyl ammonium hydroxide (TPAOH), tetrabutyl ammonium hydroxide (TBAOH) or a mixture thereof." Accordingly, reversal of the rejection is respectfully requested.

**Claim 32 is patentable under 35 U.S.C. §103(a)**

Claim 32 depends from claim 2 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein a content of impurities comprising compounds of alkali metal elements including sodium (Na) and potassium (K) in said tetraalkyl ammonium hydroxide (TAAOH) is 50 ppb by weight or below on respective element bases." Accordingly, reversal of the rejection is respectfully requested.

**Claim 33 is patentable under 35 U.S.C. §103(a)**

Claim 33 depends from claim 2 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein a content of impurities comprising compounds of halogen group elements including bromine (Br) and chlorine (Cl) in said tetraalkyl ammonium hydroxide

(TAAOH) is 1 ppm by weight or less on respective element bases." Accordingly, reversal of the rejection is respectfully requested.

**Claim 34 is patentable under 35 U.S.C. §103(a)**

Claim 34 depends from claim 2 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein a molar ratio (TAOS/AS) of said tetraalkyl ortho silicate (TAOS) and said alkoxysilane (AS) is in a range from 6/4 to 2/8." Accordingly, reversal of the rejection is respectfully requested.

**Claim 35 is patentable under 35 U.S.C. §103(a)**

Claim 35 depends from claim 34 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein a molar ratio (TAAOH/(TAOS+AS)) of said tetraalkyl ammonium hydroxide (TAAOH), and the components for forming the silica-based coating film (TAOS+AS) is in a range from 1/10 to 7/10." Accordingly, reversal of the rejection is respectfully requested.

**Claim 37 is patentable under 35 U.S.C. §103(a)**

Claim 37 depends from claim 1 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein said coating film has a surface roughness of 1 nm or below without forming a zeolitic

coating." Accordingly, reversal of the rejection is respectfully requested.

**Claim 38 is patentable under 35 U.S.C. §103(a)**

Claim 38 depends from claim 2 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein said coating film has a surface roughness of 1 nm or below without forming a zeolitic coating." Accordingly, reversal of the rejection is respectfully requested.

(2) Whether claims 10 and 36 are unpatentable under 35 U.S.C. 103(a) over Komatsu in view of Raman, Senderov, and Taguchi as applied to claims 1-9 and 29-35 above, and further in view of Burger et al. (US 2004/0041779).

**Claim 10 is patentable under 35 U.S.C. §103(a)**

Claim 10 depends from claim 1 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein the coating liquid contains a silicon compound as a hydrolysate of said tetraalkyl ortho silicate (TAOS) and said alkoxysilane (AS) by 2 to 40% by weight."

In Berger, it is held at column 0011 that "Since effective filming and adhesion of the coating requires the addition of further solvents, the solids content of the coating compositions is often relatively low as well, usually less than 35% by weight."

Burger does not disclose or suggest the main feature of claim 1. Also, Burger does not disclose or suggest a silicon compound as a hydrolysate of the tetraalkyl ortho silicate (TAOS) and the alkoxysilane (AS) of claim 10.

Accordingly, claim 10 is not obvious from the cited references. Reversal of the rejection is respectfully requested.

**Claim 36 is patentable under 35 U.S.C. §103(a)**

Claim 36 depends from claim 2 and is likewise patentable over the asserted combination of references at least based upon its dependence on an allowable base claim, as well as for the additional features it recites, "wherein the coating liquid contains a silicon compound as a hydrolysate of said tetraalkyl ortho silicate (TAOS) and said alkoxysilane (AS) by 2 to 40% by weight."

In Berger, it is held at column 0011 that "Since effective filming and adhesion of the coating requires the addition of further solvents, the solids content of the coating compositions is often relatively low as well, usually less than 35% by weight."

Burger does not disclose or suggest the main feature of claim 2. Also, Burger does not disclose or suggest a silicon compound as a hydrolysate of the tetraalkyl ortho silicate (TAOS) and the alkoxysilane (AS) of claim 36.

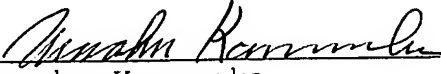
Accordingly, claim 36 is not obvious from the cited references. Reversal of the rejection is respectfully requested.

**CONCLUSION**

Accordingly, Appellants respectfully submit that the rejection of claims 1-7, 10, and 29-38 are in error, and request that the final rejection be reversed.

Respectfully submitted,

KANESAKA BERNER AND PARTNERS

By   
Manabu Kanesaka  
Reg. No. 31,467  
Agent for Applicant

1700 Diagonal Road, Suite 310  
Alexandria, VA 22314  
(703) 519-9785



## CLAIMS APPENDIX

1. A coating liquid for forming an amorphous silica-based coating film with a low dielectric constant on a substrate, said coating liquid comprising:

a silicon compound obtained by hydrolyzing tetraalkyl ortho silicate (TAOS) and alkoxysilane (AS) represented by the following general formula (I) in the presence of purified tetraalkyl ammonium hydroxide (TAAOH) without containing impurities comprising compounds of alkali metal elements and halogen group elements, a molar ratio of TAOS:AS being in a range of 6/4 to 2/8 and a molar ratio of TAAOH:(TAOS+AS) being in a range of 1/10 to 7/10, and

said purified tetraalkyl ammonium hydroxide (TAAOH),



wherein X indicates a hydrogen atom, a fluorine atom, or an alkyl group, a fluorine-substituted alkyl group, an aryl group or a vinyl group each having 1 to 8 carbon atoms; R indicates a hydrogen atom, or an alkyl group, an aryl group or a vinyl group each having 1 to 8 carbon atoms; and n is an integral number from 1 to 3.

2. A coating liquid for forming an amorphous silica-based coating film with a low dielectric constant on a substrate, said coating liquid comprising:

a silicon compound obtained by hydrolyzing or partially hydrolyzing tetraalkyl ortho silicate (TAOS) in the presence of purified tetraalkyl ammonium hydroxide (TAAOH) without containing impurities comprising compounds of alkali metal elements and halogen group elements, mixing a reaction product with alkoxysilane (AS) represented by the following general formula (I)

or a hydrolysate or a partial hydrolysate thereof, and further hydrolyzing all or a portion of a mixture:



wherein X indicates a hydrogen atom, a fluorine atom, or an alkyl group, a fluorine-substituted alkyl group, an aryl group or a vinyl group each having 1 to 8 carbon atoms; R indicates a hydrogen atom, or an alkyl group, an aryl group or a vinyl group each having 1 to 8 carbon atoms; and n is an integral number from 1 to 3.

3. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 1, wherein said tetraalkyl ortho silicate (TAOS) is tetraethyl ortho silicate (TEOS), tetramethyl ortho silicate (TMOS) or a mixture thereof.

4. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 1, wherein said alkoxysilane (AS) is methyltrimethoxy silane (MTMS), methyltriethoxy silane (MTES) or a mixture thereof.

5. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 1, wherein said tetraalkyl ammonium hydroxide (TAAOH) is tetrapropyl ammonium hydroxide (TPAOH), tetrabutyl ammonium hydroxide (TBAOH) or a mixture thereof.

6. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 1, wherein a content of impurities comprising compounds of alkali metal elements including sodium (Na) and potassium (K) in said

tetraalkyl ammonium hydroxide (TAAOH) is 50 ppb by weight or below on respective element bases.

7. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 1, wherein a content of impurities comprising compounds of halogen group elements including bromine (Br) and chlorine (Cl) in said tetraalkyl ammonium hydroxide (TAAOH) is 1 ppm by weight or less on respective element bases.

10. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 1, wherein the coating liquid contains a silicon compound as a hydrolysate of said tetraalkyl ortho silicate (TAOS) and said alkoxysilane (AS) by 2 to 40% by weight.

29. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 2, wherein said tetraalkyl ortho silicate (TAOS) is tetraethyl ortho silicate (TEOS), tetramethyl ortho silicate (TMOS) or a mixture thereof.

30. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 2, wherein said alkoxysilane (AS) is methyltrimethoxy silane (MTMS), methyltriethoxy silane (MTES) or a mixture thereof.

31. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 2, wherein said tetraalkyl ammonium hydroxide (TAAOH) is tetrapropyl ammonium hydroxide (TPAOH), tetrabutyl ammonium hydroxide (TBAOH) or a mixture thereof.

32 The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 2, wherein a content of impurities comprising compounds of alkali metal elements including sodium (Na) and potassium (K) in said tetraalkyl ammonium hydroxide (TAAOH) is 50 ppb by weight or below on respective element bases.

33. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 2, wherein a content of impurities comprising compounds of halogen group elements including bromine (Br) and chlorine (Cl) in said tetraalkyl ammonium hydroxide (TAAOH) is 1 ppm by weight or less on respective element bases.

34. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 2, wherein a molar ratio (TAOS/AS) of said tetraalkyl ortho silicate (TAOS) and said alkoxysilane (AS) is in a range from 6/4 to 2/8.

35. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 34, wherein a molar ratio (TAAOH/(TAOS+AS)) of said tetraalkyl ammonium hydroxide (TAAOH), and the components for forming the silica-based coating film (TAOS+AS) is in a range from 1/10 to 7/10.

36. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 2, wherein the coating liquid contains a silicon compound as a hydrolysate of said tetraalkyl ortho silicate (TAOS) and said alkoxysilane (AS) by 2 to 40% by weight.

37. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 1, wherein said coating film has a surface roughness of 1 nm or below without forming a zeolitic coating.

38. The coating liquid for forming a silica-based coating film with a low dielectric constant according to claim 2, wherein said coating film has a surface roughness of 1 nm or below without forming a zeolitic coating.

**EVIDENCE APPENDIX**

No copies of evidence are appended hereto.

**RELATED PROCEEDINGS APPENDIX**

No copies of decisions are appended hereto.